



MINISTRY OF FOOD

FOOD STANDARDS COMMITTEE REPORT ON ARSENIC

**Revised Recommendations for limits for
arsenic in foods**



LONDON: HER MAJESTY'S STATIONERY OFFICE
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FOURPENCE NET

FOOD STANDARDS COMMITTEE

The Food Standards Committee was appointed by the Minister of Food in 1947 with the following terms of reference:

To advise the Ministers of Food and Health and the Secretary of State for Scotland as to the provision to be made concerning the composition of foods (other than liquid milk) and the labelling or marking of any foods for which such provision is made, by:

- (a) Statutory Orders under the Defence (Sale of Food) Regulations; or
 - (b) Regulations (other than Milk and Dairies Regulations) under the Food and Drugs Acts, and corresponding enactments relating to Scotland;
- for preventing danger to health, loss of nutritional value or otherwise protecting purchasers.

The members of the Food Standards Committee are:

NORMAN C. WRIGHT, Esq., M.A., D.Sc., Ph.D., F.R.I.C. (*Chairman*).
G. G. BARNES, Esq., C.B.E. (*Vice-Chairman*).
C. A. ADAMS, Esq., C.B.E., B.Sc., F.R.I.C., Barrister at Law.
N. R. BEATTIE, Esq., M.D., D.P.H.
Professor S. J. COWELL, M.B., F.R.C.P.
N. R. C. DOCKERAY, Esq.
A. GLOVER, Esq., M.Sc., F.R.I.C.
A. J. HOWARD, Esq., M.A., F.R.I.C.
J. M. JOHNSTON, Esq., M.D., F.R.C.S.(Edin.), F.R.S.E.
G. W. MONIER-WILLIAMS, Esq., O.B.E., M.C., M.A., Ph.D., F.R.I.C.
J. R. NICHOLLS, Esq., C.B.E., D.Sc., F.R.I.C.
R. W. SUTTON, Esq., B.Sc., F.R.I.C., F.C.S.
G. TAYLOR, Esq., O.B.E., F.R.I.C.
R. F. TYAS, Esq.
R. WRIGHT, Esq., B.Sc., A.R.C.S.

Joint Secretaries:

W. M. SHORTT, Esq., M.Sc., F.R.I.C.
Mrs. J. J. TAIT.

METALLIC CONTAMINATION SUB-COMMITTEE

The Metallic Contamination Sub-Committee was appointed by the Food Standards Committee in October, 1948, with the following terms of reference:

- A. To consider the available evidence in regard to:
 - (i) The effect of the ingestion of foods contaminated with metals or other injurious elements.
 - (ii) The technological problems which might arise from the prescription of limits for such contamination.
- B. To advise:
Where the evidence is sufficient to justify the recommendation of limits for any metals or other injurious elements, what these limits should be and whether they should be applied to foods generally, to any particular food or group of foods.
- C. Generally to make proposals which may assist the Food Standards Committee to make recommendations, or to institute any further investigations which may be required.

The members of the Metallic Contamination Sub-Committee are:

G. G. BARNES, Esq., C.B.E. (*Chairman*).
Professor S. J. COWELL, M.B., F.R.C.P.
J. M. JOHNSTON, Esq., M.D., F.R.C.S.(Edin.), F.R.S.E.
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G. TAYLOR, Esq., O.B.E., F.R.I.C.

Secretary:

B. W. SMITH, Esq.

FOOD STANDARDS COMMITTEE

REPORT ON ARSENIC

Revised Recommendations for Limits for Arsenic in Foods

The Food Standards Committee have considered and approved a revised Report of their Metallic Contamination Sub-Committee recommending limits for arsenic in foods. This Report, which takes account of representations received from trade and other interests following publication of the Sub-Committee's earlier Reports, dated 26th May, 1949 and 30th June, 1951, is in the following terms:—

1. So far as is known arsenic plays no part in natural biological processes. The body may contain traces of arsenic derived from foods or from the inhalation of atmospheric dust or coal smoke; but estimates differ as to the amount normally present. Apart from rare cases, e.g., shell fish and crustacea, where arsenic appears to be naturally present, the principal sources of contamination of foods by arsenic are the use of arsenical insecticides in agriculture and the presence of arsenic in fuel and in equipment and materials used in the preparation or processing of foods.
2. In considering the necessity for prescribing limits for arsenic in foods we have examined the Report of the Royal Commission on Arsenic (published in 1903), and analytical data supplied by the Government Laboratory, the British Food Manufacturing Industries Research Association, the Port Medical Officers of Health, Public Analysts and food manufacturing firms.
3. In 1900 there was a serious outbreak of arsenical poisoning in Lancashire and Staffordshire due to beer made with glucose contaminated with arsenic. The total number of cases was estimated at over 6,000 and at least 70 persons died as a result of the outbreak. A Royal Commission appointed to investigate the matter ascertained that the outbreak arose chiefly from the use of arsenical pyrites in making the sulphuric acid used in the preparation of glucose. The Royal Commission's Report recommended that penalties should be imposed if beer or any other liquid food contained 1/100th of a grain or more of arsenic in the gallon and if solid foods contained 1/100th grain of arsenic or more in the pound. Arsenic in this connection means arsenious oxide, As_2O_3 . The recommendations of the Royal Commission have not been given statutory force but have served as standards in good commercial practice and have been accepted as recognised limits in the Courts.
4. Although the Royal Commission made a thorough survey of the whole field of arsenical contamination of food in the light of the manufacturing processes and analytical technique in use at the time, it should be borne in mind that their survey was made some fifty years ago and that the outbreak of arsenical poisoning in 1900 actually led to the initiation of research into more sensitive and accurate methods for the determination of traces of arsenic. Little was then known about the arsenical contamination of foods and the survey of the Royal Commission was necessarily limited by dependence on analytical methods still in the course of development. A great deal more information is now available with regard to the degree of contamination commonly met with in various foods, and it has been found impracticable to keep the arsenic content of some foods and food adjuncts within the narrow limits recommended by the Royal Commission. If, as we recommend, statutory limits of arsenical contamination are prescribed, provision must be made for exceptions. The risk to public health would not be measurably increased by raising the limits of contamination for some concentrated foods and food adjuncts so long as the recommended limits are rigidly applied to the staple foods.

5. While the Sub-Committee recognise that water is outside the definition of food as stated in Section 100 of the Food and Drugs Act, 1938, and that the terms of reference of the Food Standards Committee preclude recommendations in relation to standards of composition for liquid milk, it, nevertheless, seems desirable to place on record that the evidence considered in the course of the enquiry leads to the view that water and milk should not normally contain arsenic, but in any case should not contain more than 0.1 p.p.m. (parts per million) of arsenic (As).

6. In fixing limits of contamination we have found it convenient to deal separately with (i) beverages, (ii) other foods, to recommend general limits of arsenical contamination for each of these categories, to schedule a number of beverages and other foods which cannot at present be made to conform with these general limits or can be subjected to narrower limits than the general limit, and to express the limits recommended in parts per million (p.p.m.) by weight, and in terms of the element arsenic (As) as well as in terms of arsenious oxide (As_2O_3).

7. For beverages ready-to-drink we recommend a limit of 0.1 p.p.m. As (0.13 p.p.m. As_2O_3), and for other foods 1.0 p.p.m. As (1.3 p.p.m. As_2O_3). These limits are substantially the same as those recommended by the Royal Commission on Arsenic fifty years ago.

8. The foods to which the general limits cannot at present be applied are mainly concentrated foods or food adjuncts. The following table shows the list of beverages and other foods concerned and the limits recommended in each case:

<i>Article of Food</i>	<i>Limit recommended in parts per million by weight</i>	
	<i>Arsenic (As)</i>	<i>Arsenious Oxide (As_2O_3)</i>
(i) Beverages		
Cider	0.2	0.26
Black beer	0.5	0.66
Soft drinks intended for consumption after dilution, concentrates used in the manufacture of soft drinks and undiluted fruit juices	0.5	0.66
(ii) Other Foods		
Ice cream, iced lollies and similar frozen confections	0.5	0.66
Dehydrated onions	2.0	2.6
Dried hops		
Dried liquorice extract		
Edible gelatin (already prescribed)		
Liquid pectin		
Chemicals (other than chalk) used as ingredients or in the preparation or processing of foods	4.0	5.3
Chalk (creta)		
Chicory—dried or roasted		
Dried herbs	5.0	6.6
Finings and clearing agents		
Hop concentrates		
Solid pectin—all grades		
Spices	5.0 on dry colouring matter	6.6 on dry colouring matter
Food colourings other than synthetic colourings ...		

9. We are satisfied that the limits now proposed are enforceable, and that, under conditions of good commercial practice, there should be no difficulty in conforming to them. We accordingly recommend that statutory effect be given to these limits.

10. We consider that the special limits recommended in paragraph 8 should be subject to periodical review, and that in due course it should be possible to reduce the limits for cider, pectins and chicory. The limits we have proposed for food colourings and chemicals are without prejudice to any recommendations which may be made by the Preservatives Sub-Committee of the Food Standards Committee.

11. We have reviewed our earlier recommendation that in any Order which may be issued there should be a general proviso to the effect that, where an article of food permitted to contain arsenic in excess of 1 p.p.m., is used in the preparation of any other food, not being a beverage ready-to-drink, the latter food may contain that proportion of arsenic necessarily introduced by the use in its preparation of the scheduled article.

12. We now consider that this recommendation goes further than is necessary. So far as beverages ready-to-drink are concerned our view is still that no relaxation of the limits recommended for these beverages should be permitted. It is, moreover, clear that scheduled items in the nature of food adjuncts or food accessories are only used in composite foods in very small quantities and these should not, in our view, materially affect the arsenic content of the food sold.

13. On the other hand a few scheduled items, e.g., edible gelatin and chicory may be substantial constituents of some other food; and to cover this contingency we consider that in any Order which may be issued there should be a proviso making it a defence in any proceedings brought under the Order to show that the presence in a food of arsenic in excess of 1 p.p.m. is due solely to the use as a substantial ingredient of a scheduled item (or items) conforming to the requirements of the schedule.

14. We are also of opinion that in any proceedings brought under the Order it should be a defence in respect of the sale of fresh or processed crustacea, shell fish or other fish or sea-food for which a *natural* arsenic content in excess of 1 p.p.m. may have been established to show that where the arsenic content exceeds 1 p.p.m. such arsenic is natural to the fish.

FSC/MC/REP. 13

31st January, 1955.